Listing of Claims:

This listing of claims reflects all claim amendments and replaces all prior versions, and listings, of claims in the application (material to be inserted in amended claims is in underline, and material to be deleted is in ~~strikeout~~).

1. (Currently amended) A mesoporous material comprising:

a mesoporous network, wherein the network is formed from a plurality of ATRP-modified mesoporous microparticles comprising a plurality of pores; and

wherein, said ATRP modification results in a plurality of ~~a~~ stimuli responsive polymers grafted from the modified pores, wherein the plurality of stimuli responsive polymers have substantially uniform chain lengths and are spaced at regular intervals throughout ~~within~~ the porous network, so as to control the transport of a molecular species through the porous network.

2. (Cancelled).

3. (Currently amended) The material of claim 1, wherein ~~the porous network is externally and reversibly controlled to modulate the~~ adsorption of the molecular species by the mesoporous network is controlled by exposure of the stimuli responsive polymer to at least one stimuli.

4. (Currently amended) The material of claim 1, wherein the mesoporous network changes thickness and surface energy as a function of temperature.

5. (Currently amended) The material of claim 1, wherein the mesoporous network comprises silica.

6. (Original) The material of claim 1, wherein the stimuli responsive polymer comprises a poly N-isopropylacrylamide polymer.

7. (Currently amended) The material of claim 6, wherein the poly N-isopropylacrylamide polymer is extended and inhibits the transport of molecular species though the mesoporous network at a low temperature.

8. (Currently amended) The material of claim 6, wherein the poly N-isopropylacrylamide polymer is collapsed within the porous network and allows transport of molecular species through the mesoporous network at a high temperature.

9-20. (Cancelled)

21. (New) The mesoporous material of claim 1 wherein the mesoporous network has a well-controlled self-supporting architecture.

22. (New) The mesoporous material of claim 21 wherein the mesoporous network is planar.

23. (New) The mesoporous material of claim 21 wherein the mesoporous network is a bead.

24. (New) The mesoporous material of claim 1 wherein the mesoporous network forms a switchable corregated surface.

25. (New) The mesoporous material of claim 24 wherein the surface energy of the switchable corregated surface is configured to change in response to exposure of the mesoporous network to a stimuli.

25. (New) The mesoporous material of claim 25 wherein the stimuli is selected from the group consisting of: a change in temperature, a change in pH, a change in ionic strength, a change in electrical potential, a change in light, a change in viscosity, a change in redox potential, and a change in mechanical tension.

26. (New) The mesoporous material of claim 1 wherein transport of the molecular species through the material is prohibited upon exposure of the stimuli-responsive material to a stimuli.

27. (New) The mesoporous material of claim 26 wherein the stimuli is selected from the group consisting of: a change in temperature, a change in pH, a change in ionic strength, a change in electrical potential, a change in light, a change in viscosity, a change in redox potential, and a change in mechanical tension.

28. (New) The mesoporous material of claim 3 wherein the stimuli is selected from the group consisting of: a change in temperature, a change in pH, a change in ionic

strength, a change in electrical potential, a change in light, a change in viscosity, a change in redox potential, and a change in mechanical tension.